

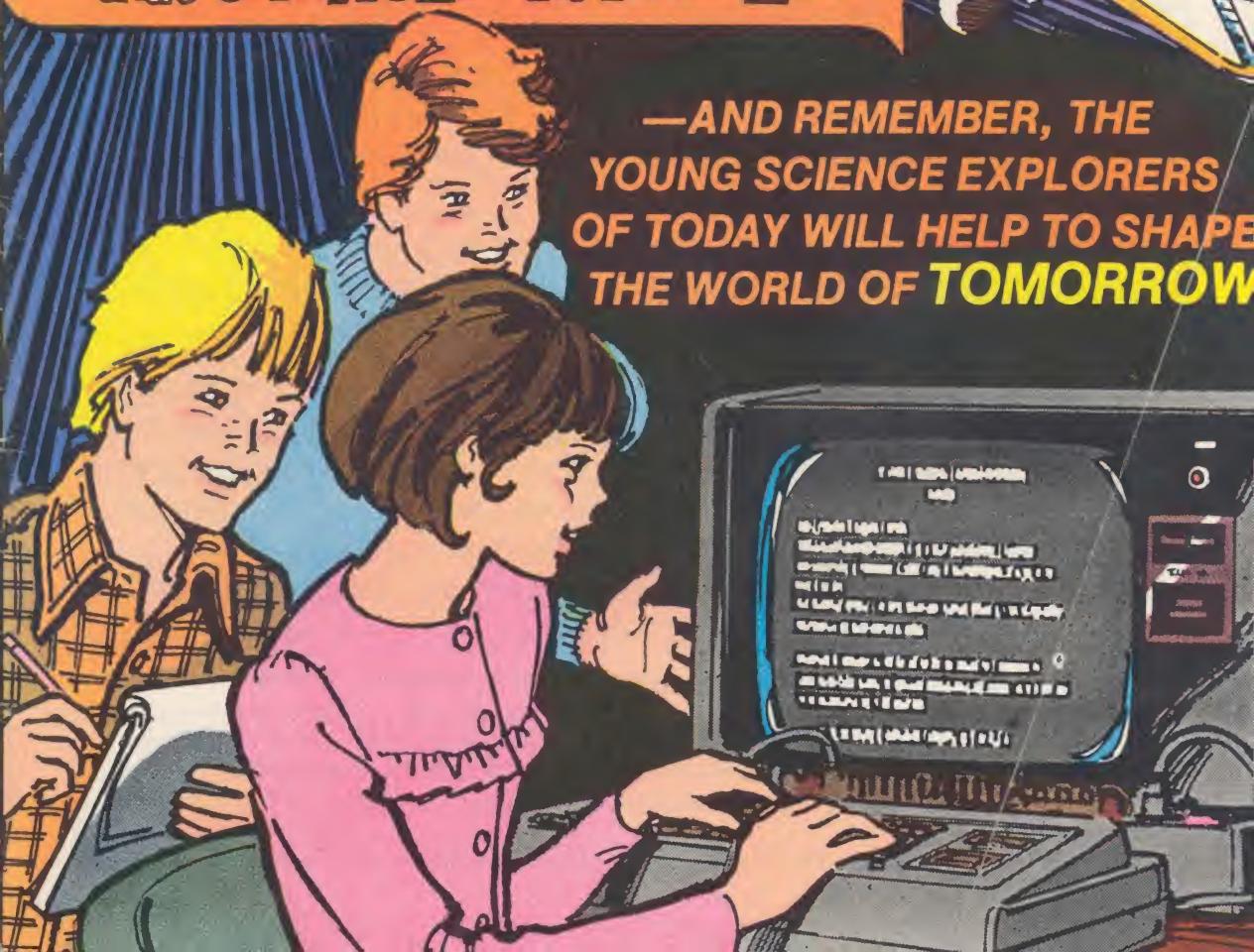
NOW!

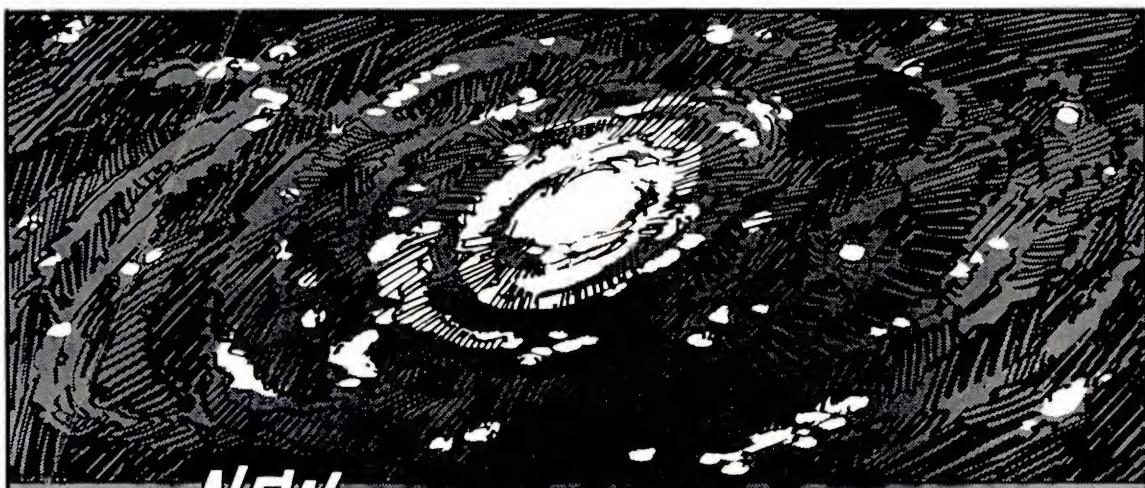
the NEW Science Fair® story of

# electronics

...the discovery  
that **CHANGED** the **WORLD!**

—AND REMEMBER, THE  
YOUNG SCIENCE EXPLORERS  
OF TODAY WILL HELP TO SHAPE  
THE WORLD OF TOMORROW





# ...the *NEW* Science Fair story of ELECTRONICS

THE STORY YOU ARE ABOUT TO READ HAD ITS BEGINNING SOME 25,000 YEARS AGO WHEN COMMUNICATIONS TOOK THE FORM OF PICTURES ON THE WALLS OF CAVES, A SIMPLE STEP BY OUR ANCESTORS TO RECORD THEIR EXPLORATIONS, DISCOVERIES, AND THEIR WAY OF LIFE FOR LATER GENERATIONS.

IT HAD ITS BEGINNING WHEN ASTRONOMY WAS BORN MORE THAN 3,000 YEARS AGO WHEN THE ANCIENT BABYLONIANS OBSERVED THE STARS AND PLANETS IN SEARCH OF ANSWERS TO THE RIDDLE OF OUR UNIVERSE.

IT HAD ITS BEGINNING IN THE CURIOSITY OF OUR ANCIENT ANCESTORS IN WHOSE FOOTSTEPS WE WALK TODAY AS WE CONTINUE TO EXPLORE NEW FRONTIERS.

MANY CENTURIES OF EXPLORATION AND SCIENTIFIC DISCOVERIES BROUGHT MANKIND TO THE AGE OF THE TELEPHONE, RADIO, THE COMPUTER, TELEVISION, TAPE RECORDING AND PLAYBACK, STEREO HI-FI, GLOBAL SATELLITE COMMUNICATION, AND RADIO AND TELEVISION COMMUNICATION WITH AN AMERICAN NASA VIKING 1 LANDER ON THE PLANET MARS, 400 MILLION MILES FROM OUR WORLD — THINGS WHICH MOSTLY DID NOT EXIST EVEN 60 YEARS AGO.

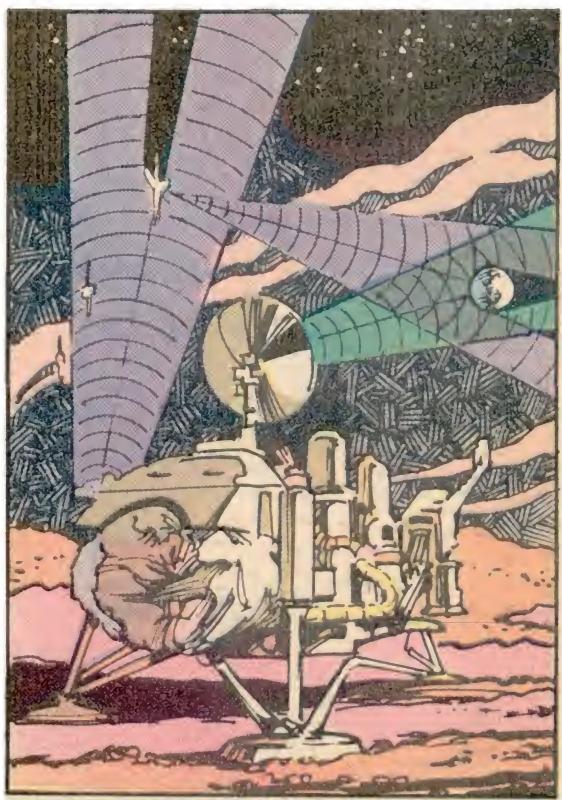
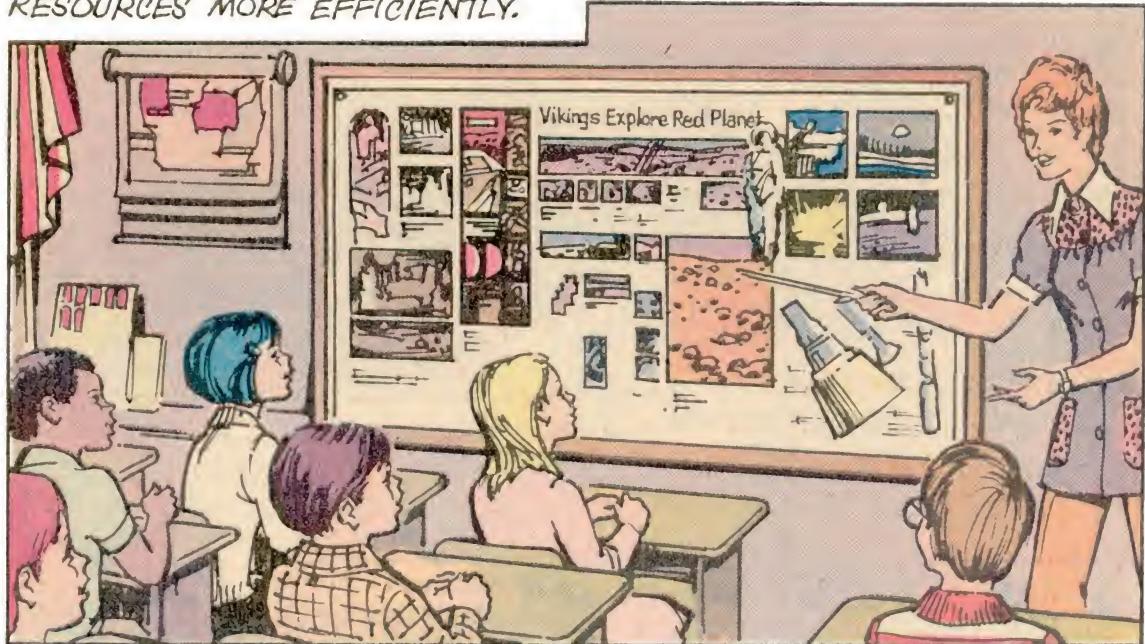
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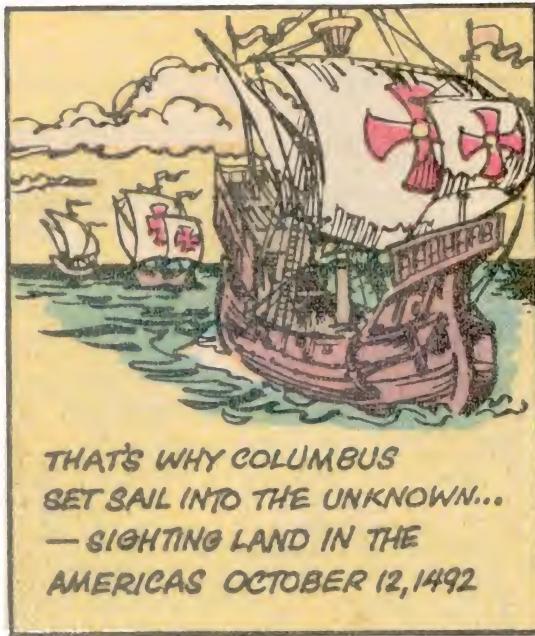
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TODAY, SPACE MISSIONS INCREASE OUR KNOWLEDGE ABOUT OTHER PLANETS—LIKE MARS—WHICH CAN HELP US TO USE EARTH'S RESOURCES MORE EFFICIENTLY.



AND, LIKE THE DARING VIKINGS WHO TOUCHED THE SHORES OF CANADA ABOUT 1000 A.D., WE MUST CONTINUE TO EXPLORE... TO DISCOVER... TO PAVE THE WAY FOR FUTURE GENERATIONS.

... AND THAT'S WHY AN AMERICAN "VIKING"—A ROBOT EXPLORER—TOUCHED DOWN ON THE PLANET MARS, 400 MILLION MILES FROM EARTH, JULY 20, 1976.

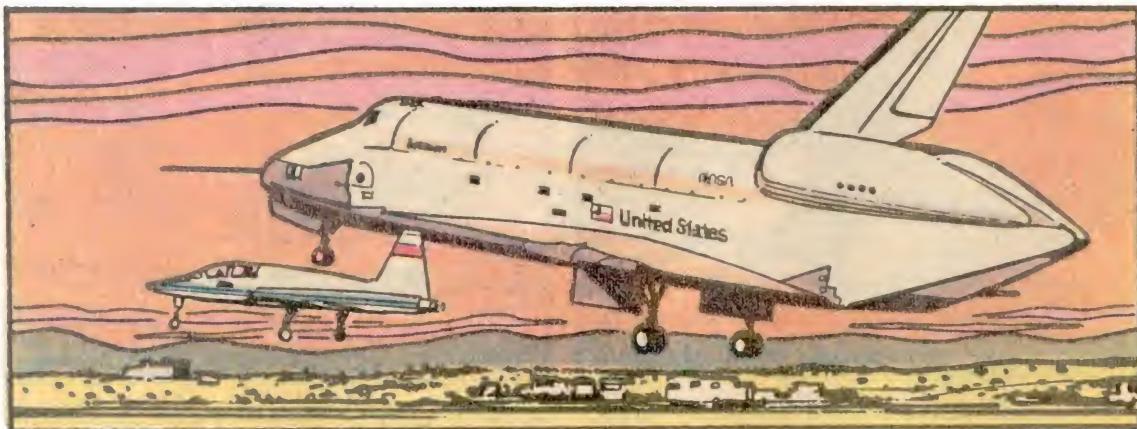


THAT'S WHY COLUMBUS  
SET SAIL INTO THE UNKNOWN...  
— SIGHTING LAND IN THE  
AMERICAS OCTOBER 12, 1492



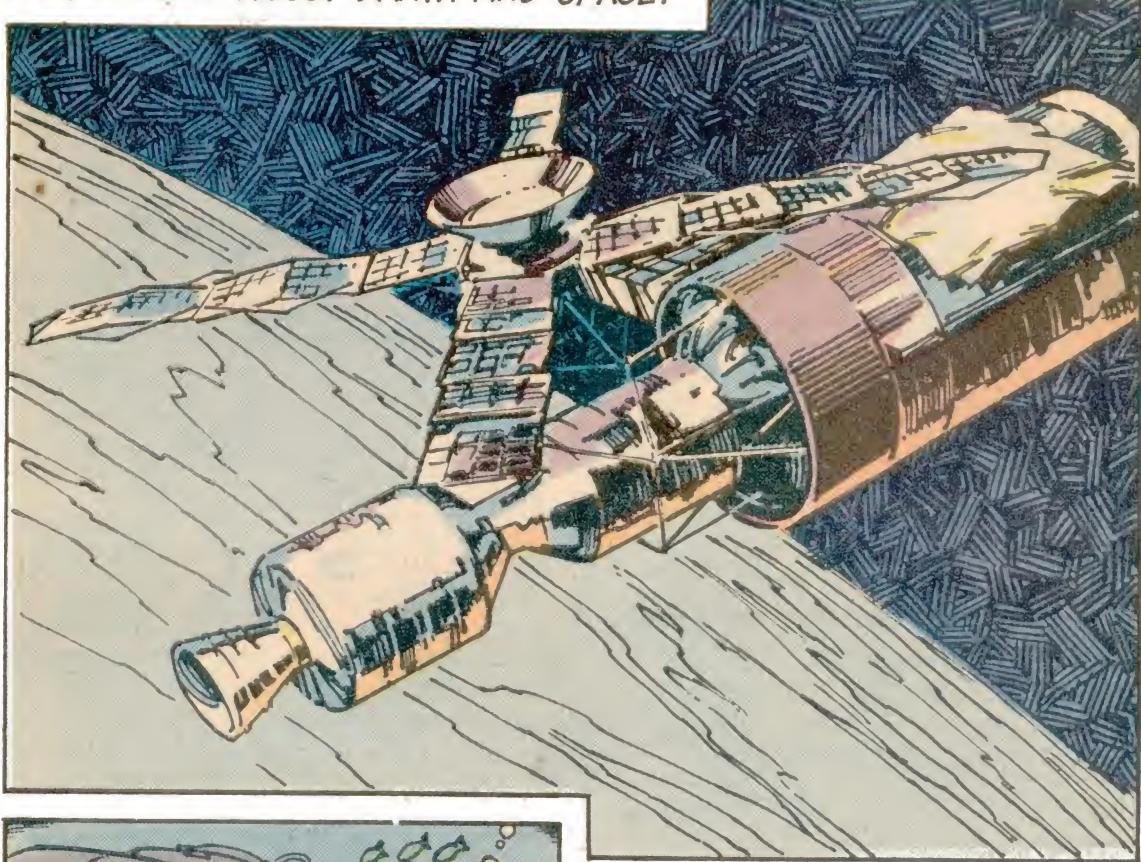
IN THE EARLY 1920'S, AMERICAN  
EXPLORERS NEAR THE NORTH POLE  
TALKED BY RADIO TO THE PEOPLE  
OF MANY NATIONS.

THAT'S WHY AMERICAN EXPLORERS  
NEIL ARMSTRONG AND EDWIN  
ALDRIN SET THEIR SPACE SHIP  
DOWN ON THE MOON'S SEA OF  
TRANQUILLITY IN 1969 — THEN  
TALKED FROM THERE BY RADIO  
AND TELEVISION, WITH A U.S.  
PRESIDENT IN WASHINGTON, D.C.  
— A STEPPINGSTONE FOR THE  
EXPLORERS WHO WILL TRAVEL EVEN  
DEEPER INTO OUTER SPACE.



AMERICA'S NEW SPACE SHUTTLE ORBITER "ENTERPRISE" LANDS  
LIKE AN AIRPLANE AFTER RETURNING FROM ORBIT AROUND THE  
EARTH, USING A MICROWAVE LANDING SYSTEM — MUCH BETTER THAN  
THE OLD "PARACHUTE LANDING" OF A CREW CAPSULE IN THE OCEAN.

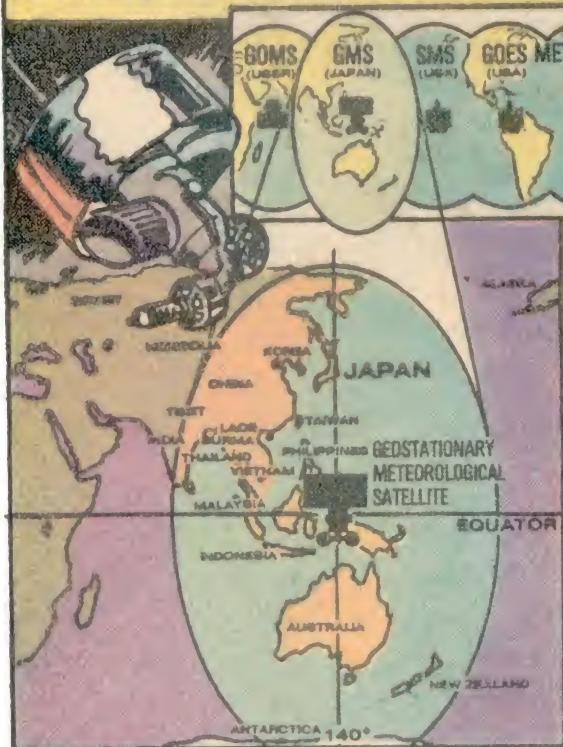
MANY THINGS WE READ ABOUT SCIENCE TODAY... STRANGE-LOOKING SPACE SHIPS... ARE NO LONGER "SCIENCE-FICTION" STORIES — LIKE AMERICA'S **SKYLAB** ORBITING SPACE STATION. IT HELPS US TO LEARN MORE ABOUT EARTH AND SPACE.



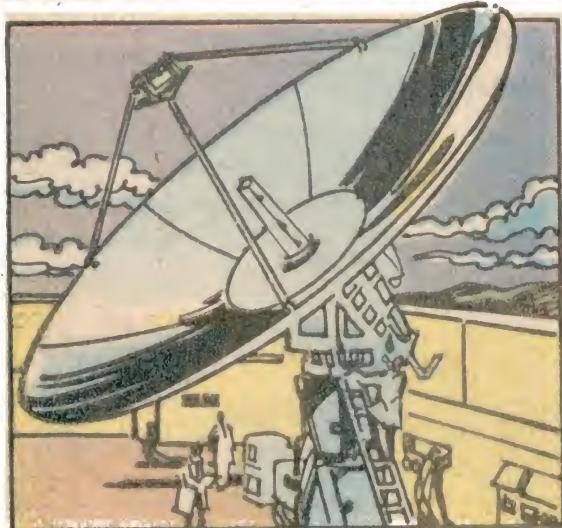
TODAY, SCIENCE EXPLORERS WITH THE AID OF ELECTRONICS ARE ALSO SEARCHING THE OCEAN FLOOR FOR NEW RESOURCES AND WAYS TO RETRIEVE THEM. MORE AND MORE PETROLEUM COMES...

... FROM WELLS DRILLED IN THE OCEAN FLOOR. UNDERSEA CRAFT, WITH WORK CREWS, HAVE EXPLORED DEPTHS THOUSANDS OF FEET DEEP ... PLANTING A FLAG TO MARK THEIR ACHIEVEMENT!

THE WORLD METEOROLOGICAL ORGANIZATION NOW HAS A "WORLD WEATHER WATCH" PROGRAM TO KEEP PEOPLE AROUND THE WORLD INFORMED ABOUT STORM AND WEATHER MOVEMENTS. EARLY STORM WARNINGS CAN SAVE LIVES AND REDUCE PROPERTY DAMAGE.



WE MAY SOON HAVE OVERSEAS SATELLITE MAIL, USING AIR ELECTRONIC MESSAGE SERVICE BETWEEN THE UNITED STATES AND OVERSEAS LOCATIONS... ANOTHER BENEFIT OF OUR SATELLITE AND SPACE EXPLORATION PROGRAM!



MOBILE SATELLITE GROUND STATIONS SENDING ELECTRONIC SIGNALS TO SATELLITES ABOVE THE EARTH LET US SEE WORLDWIDE EVENTS LIKE THE OLYMPIC GAMES ON COLOR TELEVISION... AND NEWS AND CULTURAL PROGRAMS.



THAT'S A GOOD QUESTION,  
JIM! NO ONE KNOWS THE  
EXACT BEGINNING...



... BUT THE STORY OF  
ELECTRONICS CAN BE  
TRACED BACK OVER  
2,000 YEARS.

— OVER  
2,000 YEARS?

AS EARLY AS 600 B.C., THALES OF  
MILETUS, GREECE, THEORIZED A  
CONNECTION BETWEEN ELECTRICITY  
AND MAGNETISM. THE ANCIENTS  
EVEN TRIED ELECTRIC SHOCKS FROM  
EELS AS A TREATMENT FOR  
RHEUMATIC DISEASES!



THAT'S RIGHT... AND WHILE WE  
DON'T KNOW FOR SURE, IT MIGHT  
HAVE BEGUN LIKE THIS:



BATTERIES WERE USED FOR  
ELECTROPLATING GOLD, SILVER AND  
ANTIMONY AS EARLY AS 227 B.C.  
— LIKE THE TYPES UNCOVERED BY  
ARCHAEOLOGISTS IN IRAQ, IN 1936.

ABOUT 1200 A.D., PETER PEREGRINUS  
WROTE ABOUT THE COMPASS WHILE  
WATCHING THE SIEGE OF A BIG CITY.  
— THE EARLY MARINER'S COMPASS  
WAS A FLOATING BOARD, CARRYING  
A PIECE OF LODESTONE.



IN 1600 A.D., GILBERT PUBLISHED THE FIRST SCIENTIFIC STUDY OF ELECTRICITY AND MAGNETISM, CALLED "DE MAGNETE."



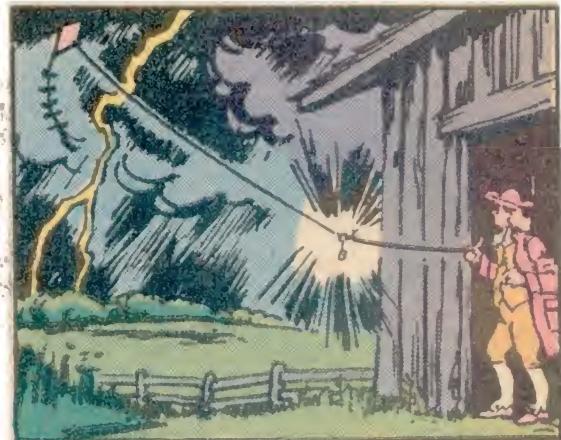
HE LEARNED IT WAS, AND THEN DEVISED HIS LIGHTNING ROD SYSTEM TO BLEED OFF GROUND AND AIR CHARGES — USED ON HOMES AND OTHER BUILDINGS TO THIS DAY.



AN IMPROVED BATTERY DESIGN WAS MADE BY ALESSANDRO VOLTA IN 1800. OTHER INVENTORS MADE IMPROVEMENTS LATER.



BENJAMIN FRANKLIN SET OUT TO DISCOVER IF NATURAL LIGHTNING WAS THE SAME STUFF AS ARTIFICIAL ELECTRICITY IN HIS FAMOUS KITE AND WIRE EXPERIMENT.

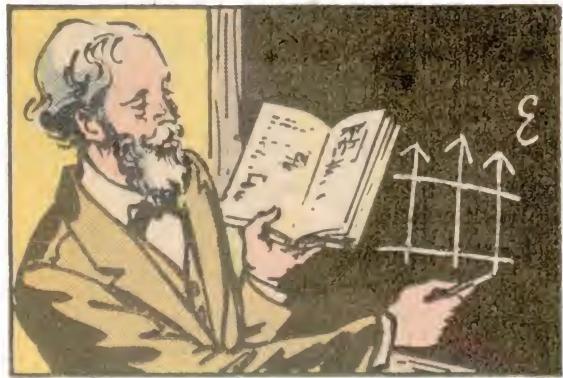


FRANKLIN ALSO ORIGINATED THE "PLUS" AND "MINUS" SIGNS WE USE TO INDICATE ELECTRICAL POLARITY. YOU'LL SEE THESE SIGNS ON FLASHLIGHT BATTERIES.

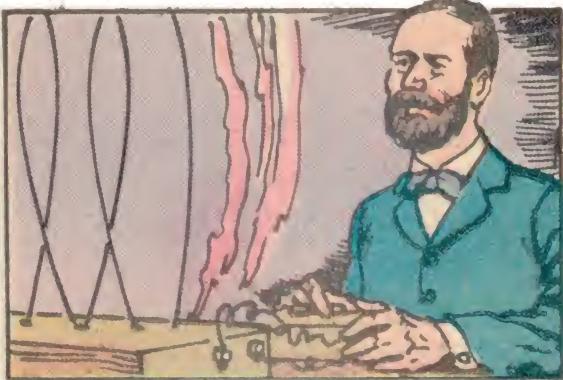


LATER, FARADAY DEVISED THE FIRST MACHINE TO MAKE ELECTRICITY FROM MECHANICAL ENERGY. IT WASN'T VERY EFFICIENT ... BUT IT WORKED!

ABOUT THIS TIME, MAXWELL WAS STUDYING THE WORKS OF FARADAY, DAVY, AND OTHERS. HIS MATHEMATICS PREDICTED "ELECTROMAGNETIC DISTURBANCES" IN SPACE ...



...HERTZ FOUND A WAY TO CREATE THE "DISTURBANCES" STUDIED BY MAXWELL, AND SHOWED THEY BEHAVED IN THE SAME WAY AS LIGHT! — IT WAS THE BEGINNING OF "WIRELESS" RADIO.



GEE! AN AWFUL LOT OF PEOPLE MUST HAVE STUDIED ELECTRICITY BEFORE ANYBODY COULD ACTUALLY USE IT!

...YES, AND THEIR NAMES ARE STILL WITH US!  
— THE "GILBERT" IS A UNIT OF MAGNETISM!



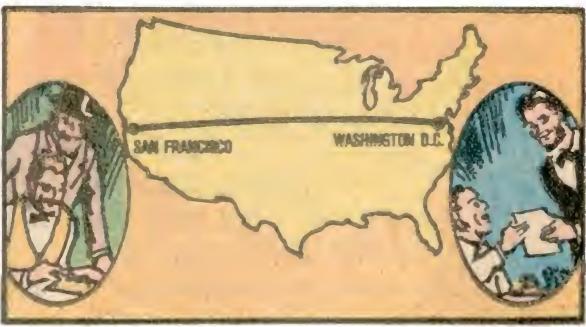
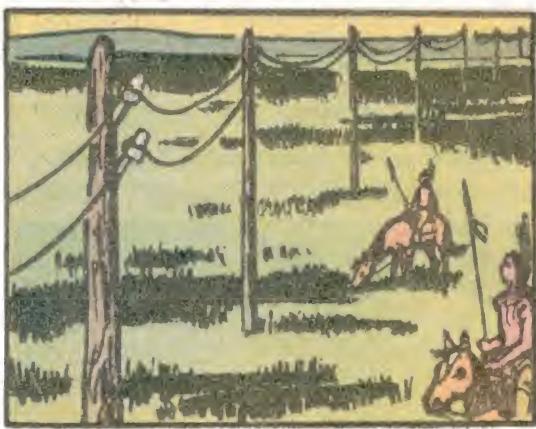
OTHER COMMON ONES ARE: OHM, FARAD, AMPERE, AND HENRY...

FOR JOSEPH HENRY, WHO ALSO BUILT THE FIRST ELECTROMAGNET, LATER USED FOR THE DIRECT CURRENT MOTOR.



IN 1846, JOSEPH HENRY, INVENTOR AND TEACHER, BECAME THE FIRST SECRETARY OF THE SMITHSONIAN INSTITUTION IN WASHINGTON, D.C., WHICH WAS BORN FROM A GIFT TO THE PEOPLE OF AMERICA BY JAMES SMITHSON OF SCOTLAND.

IN 1837, AT THE AGE OF 44, SAMUEL MORSE, A PORTRAIT ARTIST, BUILT THE FIRST PRACTICAL TELEGRAPH SOUNDER. THE FIRST TELEGRAM, "WHAT HATH GOD WROUGHT" WAS SENT IN 1844.

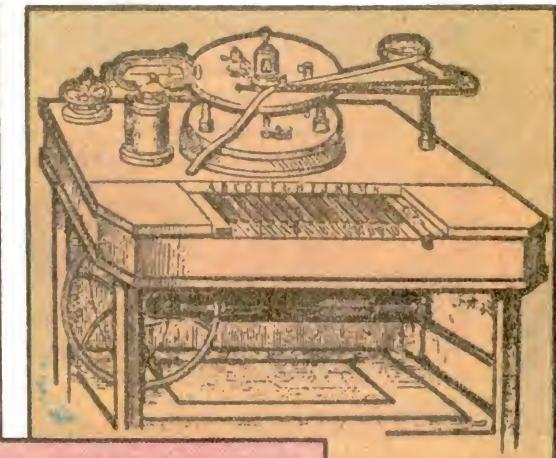


HIS WIRE TELEGRAPH WAS THE FIRST PRACTICAL LONG-RANGE COMMUNICATIONS SYSTEM. IN 1861, STEPHEN FIELD SENT THE FIRST TRANSCONTINENTAL TELEGRAPH MESSAGE TO PRES. LINCOLN...

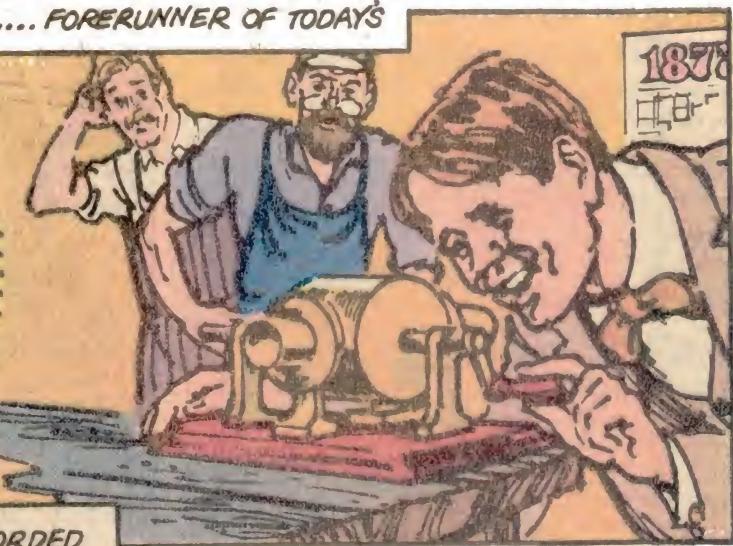
... FROM SAN FRANCISCO, CALIFORNIA TO WASHINGTON, D.C. THE YOUNG TELEGRAPH SYSTEM GOT ITS BAPTISM OF FIRE DURING THE U.S. CIVIL WAR WHICH BEGAN THAT YEAR.



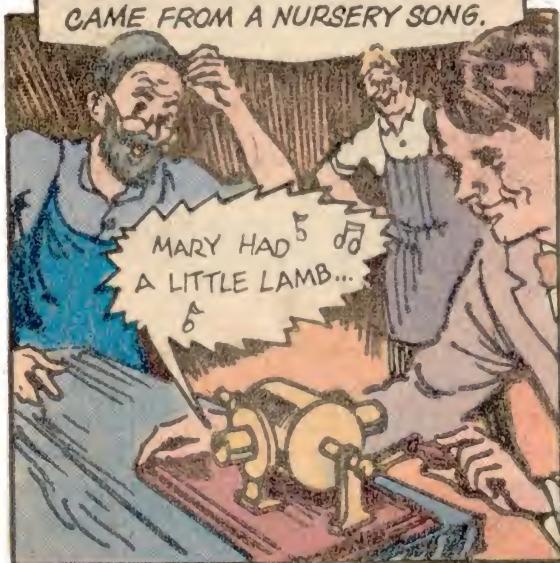
IN JULY, 1861, GENERAL McCLELLAN CLAIMED FIRST USE OF THE TELEGRAPH UNDER ACTUAL BATTLE CONDITIONS. — ALSO USED LATER IN THE CIVIL WAR WAS THE TELEGRAPH PRINTER, INVENTED BY ROYAL HOUSE OF VERMONT. IT USHERED IN A NEW ERA IN RAPID COMMUNICATIONS.



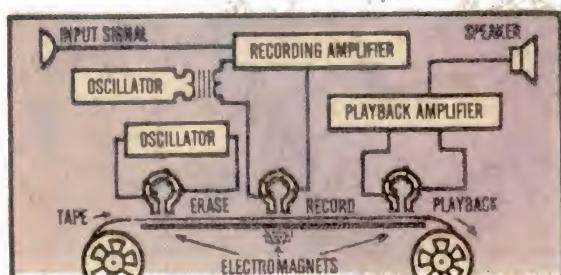
THOMAS EDISON IS BEST REMEMBERED FOR HIS INVENTION OF THE ELECTRIC LIGHT BULB, BUT JUST AS GREAT WAS HIS PHONOGRAPH FOR SOUND RECORDING AND PLAYBACK.... FORERUNNER OF TODAY'S HI-FI STEREO SYSTEMS!



THE FIRST WORDS RECORDED  
... AND PLAYED BACK... ON  
EDISON'S TIN-FOIL RECORD  
CAME FROM A NURSERY SONG.



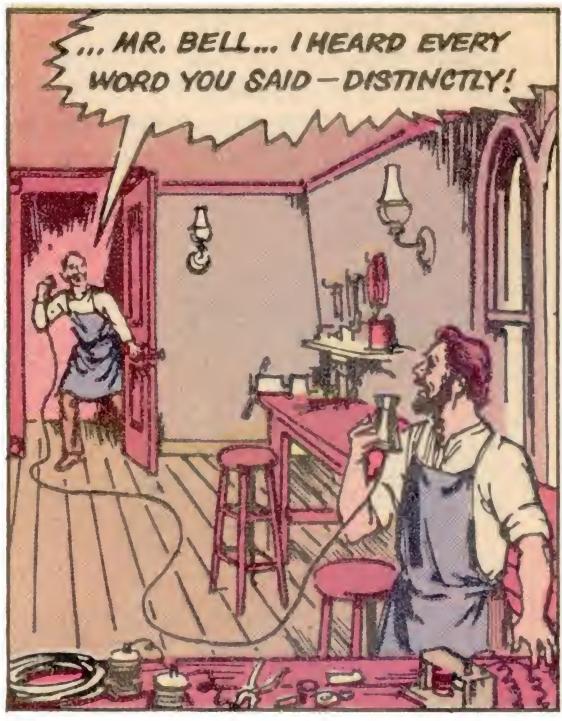
A HUNDRED YEARS AFTER THE FIRST PHONOGRAPH, SYSTEMS LIKE THIS CAN RECORD—AND PLAY BACK—LIFELIKE MUSIC ON A TAPE, RECORDS OR PLAY AM/FM MUSIC OVER ITS RADIO.



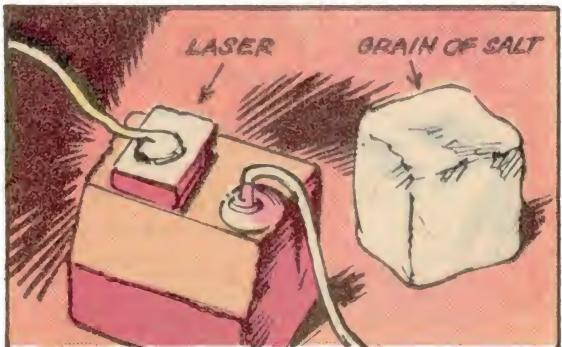
MAGNETIC RECORDING WAS INVENTED  
BY VALDEMAR POULSEN IN 1889.  
TAPE RECORDING WAS DEVELOPED IN  
THE LATE 1930'S... THIS DIAGRAM  
SHOWS HOW TAPE IS RECORDED.

TODAY TINY POCKET-SIZE RECORDERS  
ARE THE THING FOR DICTATION, MEETING  
OR LECTURE NOTES, LANGUAGE STUDY  
OR FOR RECORDING THE SOUNDS  
OF A VACATION TRIP.

BELL'S FIRST TELEPHONE PATENT WAS ISSUED MARCH 7, 1876. JUST THREE DAYS LATER, ON THE TOP FLOOR OF A BOARDINGHOUSE AT NO. 5 EXETER PLACE, BOSTON, MASSACHUSETTS, THE TELEPHONE CARRIED ITS FIRST INTELLIGIBLE SENTENCE.



AND MANY TELEPHONES WILL HAVE A "PICTURE PHONE" SO YOU CAN SEE AS WELL AS HEAR THE PERSON YOU'RE TALKING TO!

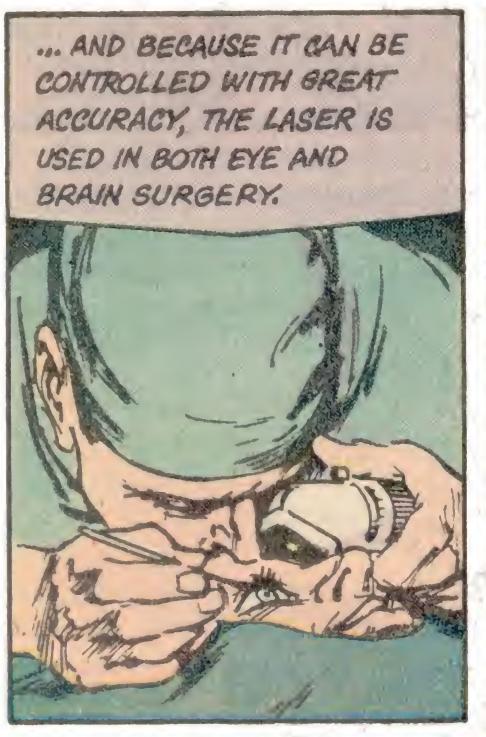
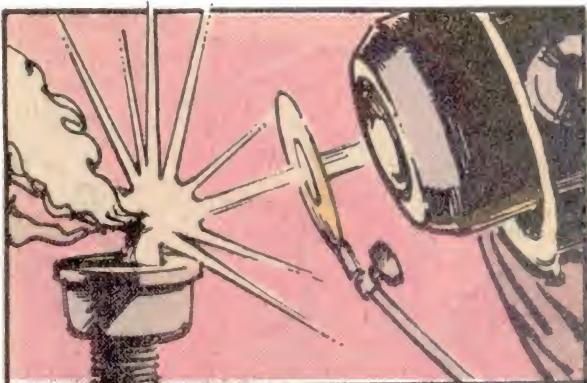


SMALLER THAN A GRAIN OF SALT, THIS SOLID-STATE LASER (ARROW) MAKING A LIGHT THROUGH TINY GLASS FIBERS WILL MAKE IT POSSIBLE TO "TALK BY TELEPHONE OVER A BEAM OF LIGHT." — ANOTHER MIRACLE OF SCIENCE!



YES, SCIENTISTS ARE STILL FINDING NEW WAYS TO USE THE LASER!

A LASER CAN FOCUS ENORMOUS ENERGY ON A VERY SMALL AREA TO CUT STEEL OR BURN HOLES IN DIAMOND WIRE DIES...



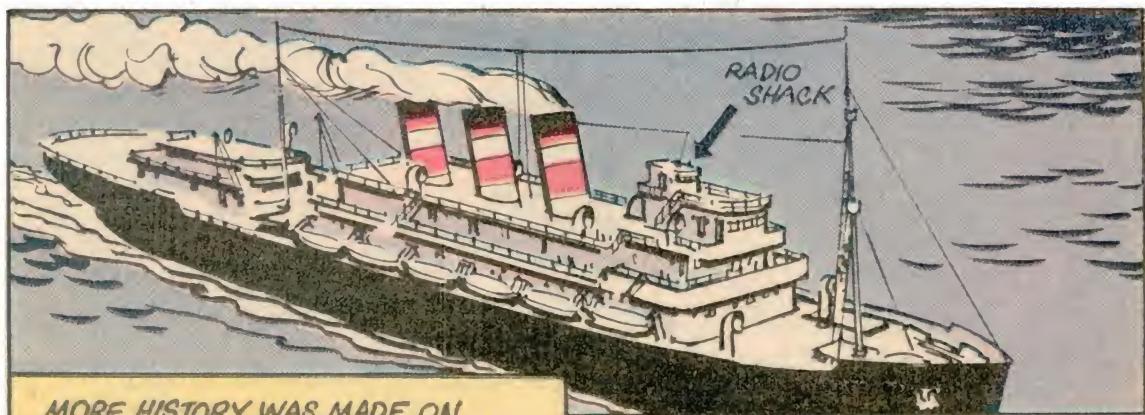
SOMEDAY, MAYBE WE COULD TALK EVEN TO PEOPLE IN OUTER SPACE. IT IS BELIEVED THAT A LASER BEAM, PROJECTED FROM EARTH, COULD STILL BE DETECTED AT 100 LIGHT YEARS DISTANCE!

NOW, LET'S GET BACK  
TO OUR HISTORY LESSON  
ON ELECTRONICS...

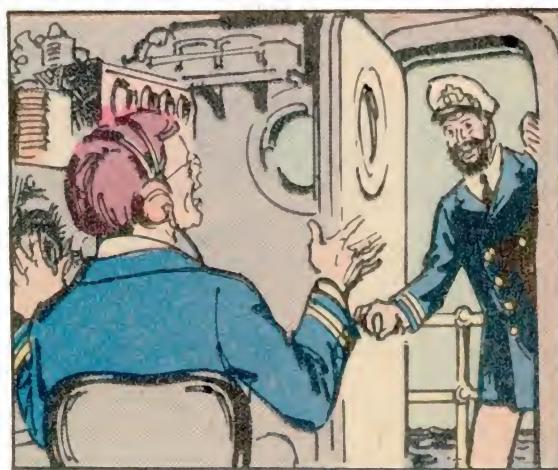
ON DECEMBER 12, 1901, GUGLIELMO MARCONI SENT THE FIRST TRANS-ATLANTIC WIRELESS MESSAGE FROM ENGLAND TO NEWFOUNDLAND. THIS SUCCESS SHOWED THE LONG-RANGE POSSIBILITIES OF RADIO COMMUNICATIONS.



SEVERAL YEARS LATER, SHIPS WERE ADDING A SMALL ROOM TO THE TOP DECK TO HOUSE MARCONI'S WIRELESS RADIO SETS — THIS ROOM WAS CALLED THE "RADIO SHACK" BY SAILORS.



MORE HISTORY WAS MADE ON CHRISTMAS EVE, 1906, WHEN AN INVENTOR, REGINALD FESSENDEN, USED HIS TRANSMITTER TO SEND THE HUMAN VOICE BY WIRELESS FOR THE FIRST TIME OVER...



FROM A WIRELESS STATION  
AT BRANT ROCK, MASSACHUSETTS...

... HUNDREDS OF MILES — HEARD BY  
MANY AMAZED WIRELESS OPERATORS  
ABOARD SHIPS AT SEA!

BOB, WHAT REVOLUTIONIZED ELECTRONICS A FEW YEARS AFTER MARCONI'S SUCCESSFUL TRANS-ATLANTIC RADIO TEST?

IT WAS THE DE FOREST "AUDION" RADIO TUBE IN 1915. — IT MADE POSSIBLE LOUDER SOUND FROM RADIOS.

RIGHT, BOB! IN A FEW YEARS RECEIVERS USING AUDION TUBES REVOLUTIONIZED RADIO LISTENING — MORE STATIONS COULD BE TUNED IN... EVEN THOSE FAR AWAY!



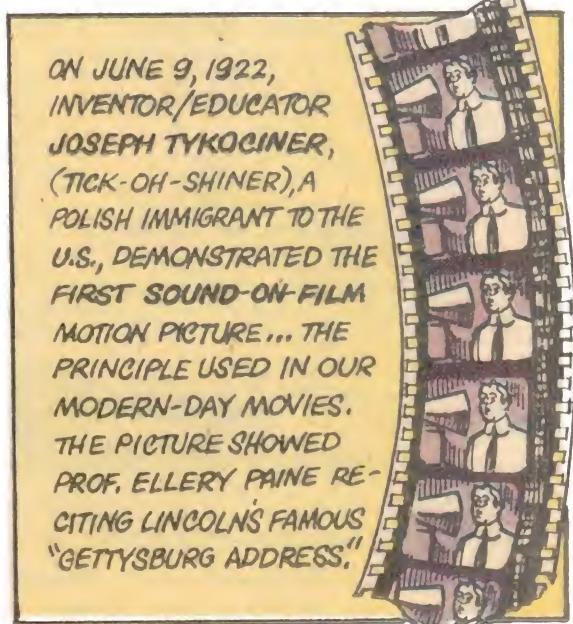
LEE DE FOREST'S INVENTION OF THE AUDION MARKED THE BEGINNING OF REGULAR RADIO BROADCASTS INTO THE HOME...



EARLY-DAY RADIO SETS WERE LARGE, AND THE LOUDSPEAKER LOOKED LIKE THE HORN OF A MUSICAL INSTRUMENT.



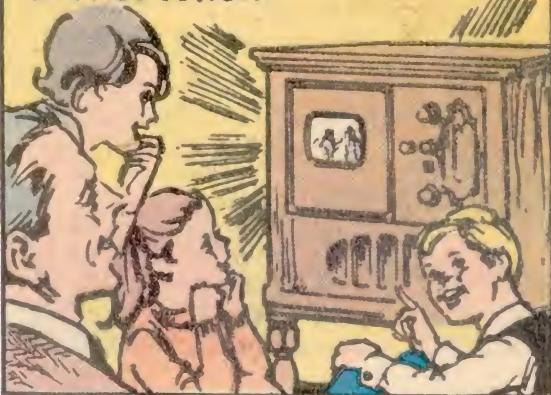
SOON, EVEN BETTER RADIO SETS WERE MADE. U.S. ARMY MAJ. EDWIN ARMSTRONG DEVELOPED THE SUPERHETERODYNE RECEIVER DURING WORLD WAR I. IT GAVE THE U.S. AND ITS ALLIES A GREAT ADVANTAGE. HE ALSO DEVELOPED FM RADIO DURING THE LATE 1930'S.



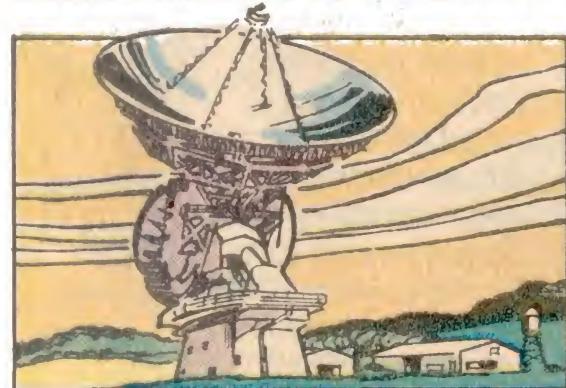
— OTHER FIELDS OF ELECTRONICS  
BEGAN TO DEVELOP ALSO... IN 1933,  
KARL JANSKY ANNOUNCED THE DISCOV-  
ERY OF RADIO WAVES FROM OUTER  
SPACE... THE BEGINNING OF  
RADIO ASTRONOMY.



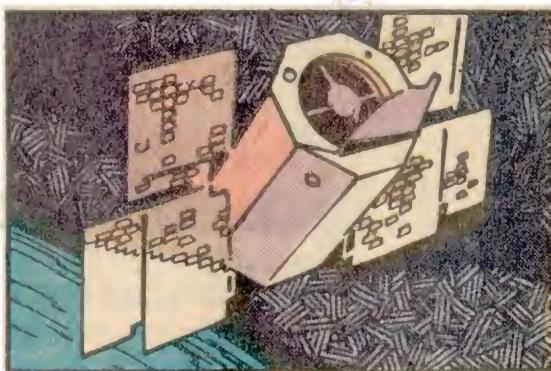
BY 1939, ELECTRONICS WAS A VERY  
ACTIVE BUSINESS AND INDUSTRIAL  
FIELD. THERE WERE EVEN SOME  
SMALL COMMERCIAL TV SETS  
IN PRODUCTION.



TV DEVELOPED RAPIDLY AFTER WORLD  
WAR II. ITS PORTABILITY AND ADAPT-  
ABILITY TO STRANGE ENVIRONMENT  
MADE TV A VALUABLE SCIENTIFIC  
TOOL. ON JULY 20, 1969, IT SHOWED  
US THE FIRST MEN ON THE MOON.



GIANT RADIO TELESCOPES HAVE BEEN  
BUILT, LIKE THE RADIO ASTRONOMY OB-  
SERVATORY AT GREENBANK, W. VA., TO HELP  
US LEARN MORE ABOUT OUTER SPACE.

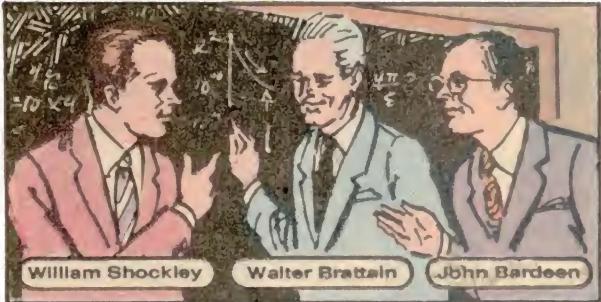


A TELESCOPE SCANNING OUTER SPACE  
FROM A PLATFORM-IN-ORBIT CAN SEND TV  
PICTURES OF WHAT IT SEES BACK TO EARTH.

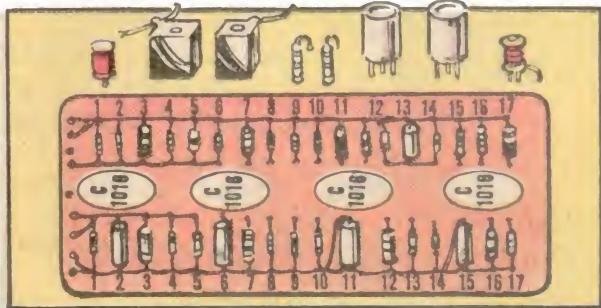
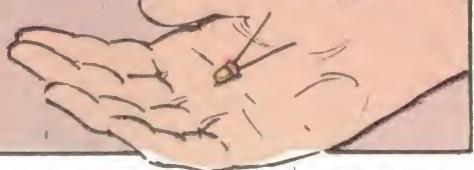
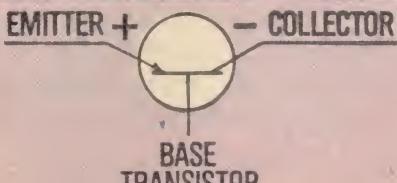
IN THE LATE 1940'S, SCIENTISTS MADE A REVOLUTIONARY DISCOVERY FOR RADIO CIRCUITS... WHAT WAS IT?

I KNOW—THE TRANSISTOR! —IN 1948.

YES, THE NOBEL PRIZE IN PHYSICS WAS SPLIT BETWEEN THREE MEN... FOR THE INVENTION OF THE TRANSISTOR: JOHN BARDEEN, WILLIAM SHOCKLEY, AND WALTER BRATTAIN. IT REVOLUTIONIZED THE ELECTRONICS INDUSTRY.



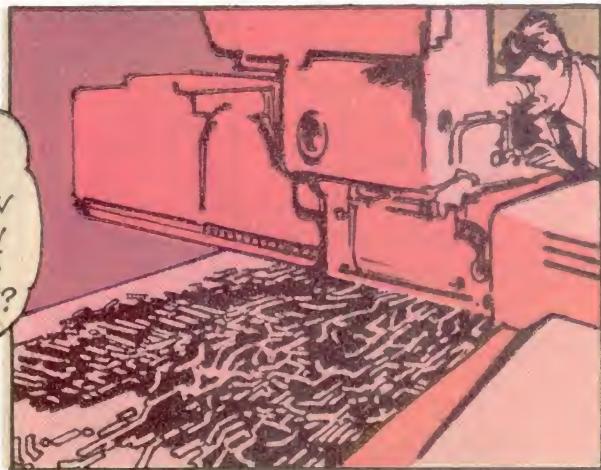
THIS IS THE SYMBOL FOR THE TINY TRANSISTOR... WHICH MADE POSSIBLE SMALL, LIGHTWEIGHT RADIOS.



ANOTHER GIANT STEP OF THIS EVOLUTION TOWARD MINIATURIZATION WAS THAT OF PRINTED CIRCUITS. SOLID-WIRE CONNECTIONS AND TUBES WERE BEING REPLACED BY PRINTED CONNECTIONS ON A FLAT CIRCUIT BOARD.

THIS MAY SEEM HARD TO BELIEVE, BUT IT'S NOW POSSIBLE TO PRINT AS MANY AS 18,000 CIRCUITS ON A ONE-INCH BOARD!

GEET!  
JUST HOW SMALL CAN YOU BUILD A CIRCUIT?



...THIS IS KNOWN AS MOLECULAR ELECTRONICS, WHERE MATERIAL ONLY ONE MILLIONTH OF AN INCH THICK IS USED. SOMEDAY, THIS CIRCUITRY BUILDING WILL BE DONE ENTIRELY BY AN ELECTRONIC BEAM.

COMPUTER ENGINEERS WERE  
VERY INTERESTED IN THE TRANSISTOR  
BECAUSE OF ITS SMALL SIZE  
AND EFFICIENCY.

WOW!

IN 1959, A COMPUTER WAS BUILT  
WITH 18,800 TUBES. IF IT HAD BEEN  
BUILT TODAY, IT WOULD HAVE NEEDED  
ONLY 4000 TRANSISTORS.

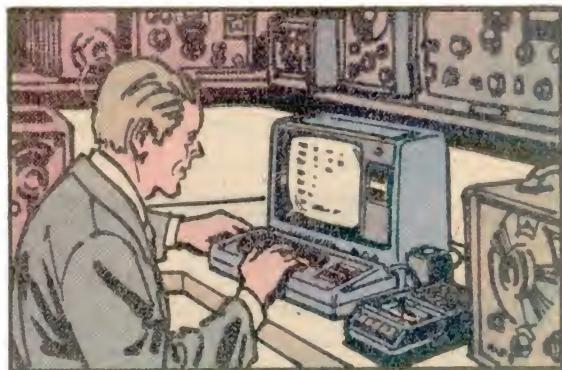
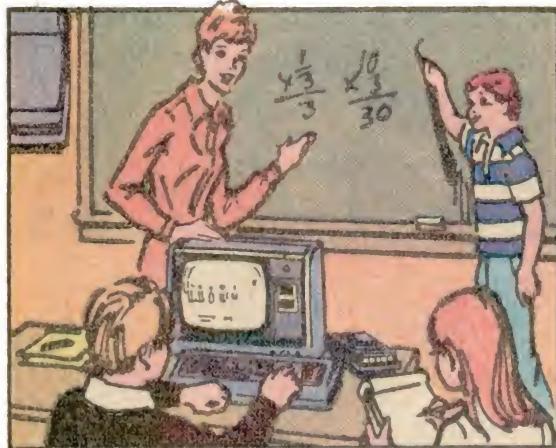
NOW, TRANSISTORIZED COMPUTERS CAN  
PREDICT WEATHER AND SEVERE STORMS. THEY CAN  
EVEN OPERATE SOME MACHINES IN FACTORIES...

SOLID-STATE ELECTRON-  
ICS MADE POSSIBLE  
NOT ONLY OUR GIANT  
COMPUTERS, BUT ALSO  
OUR TINY, POCKET-SIZE  
CALCULATORS IN EVERY-  
DAY USE BY STUDENTS,  
BUSINESSMEN, AND  
HOUSEWIVES... HIGHLY  
POPULAR IN THE U.S.

EC-245

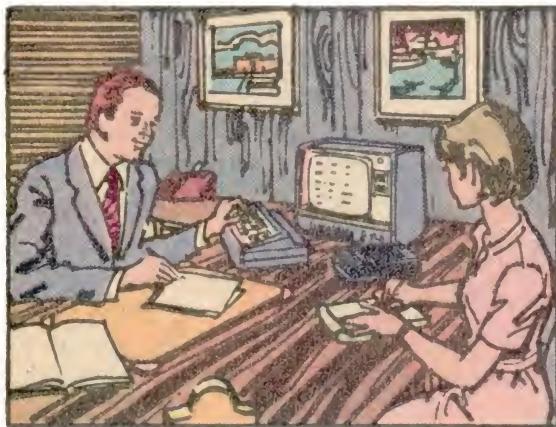
AND NOW, THERE'S EVEN A TINY COMBINA-  
TION CALCULATOR-AND-WATCH ABOUT  
THE SIZE OF A REGULAR WRISTWATCH!

TODAY, MICROCOMPUTER SYSTEMS COSTING AS LITTLE AS A CONSOLE TV SET ARE FINDING USES IN TEACHING/LEARNING...



...AS AN AID IN SCIENTIFIC RESEARCH LABORATORY WORK... TO SPEED TESTING AND DESIGN PROCEDURES...

...IN REDUCING TIME AND PAPERWORK FOR SMALL-BUSINESS OPERATIONS...



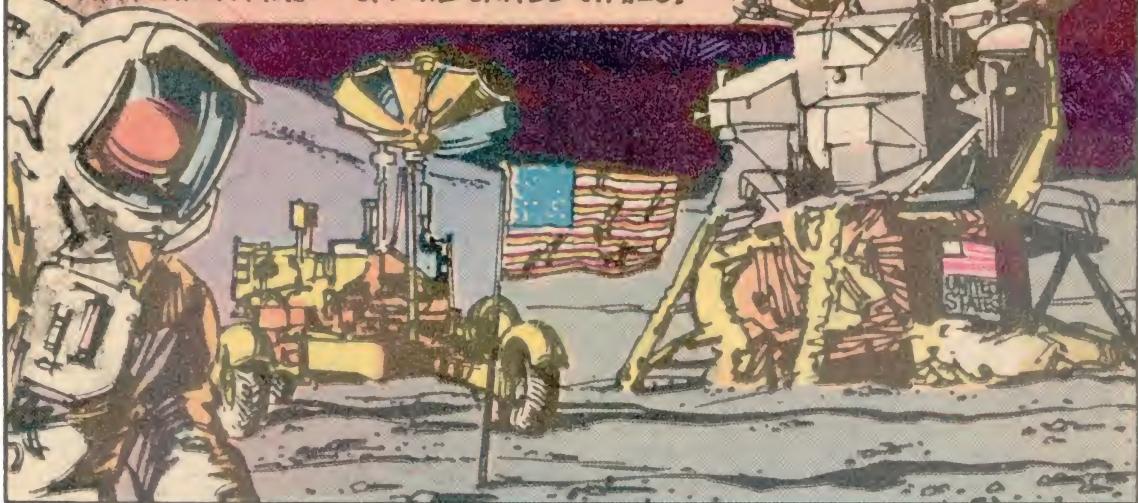
AS WELL AS USE AT HOME... FOR COMPUTING FAMILY FINANCES AND FOR PLAYING THE NEW TV GAMES.

COMPUTERS WERE DEVELOPED BECAUSE THEY COULD DO ROUTINE WORK FAST AND RELIABLY. EVEN A SMALL COMPUTER REPLACES A ROOM FULL OF CLERKS DOING TEDIOUS AND OFTEN INACCURATE WORK.

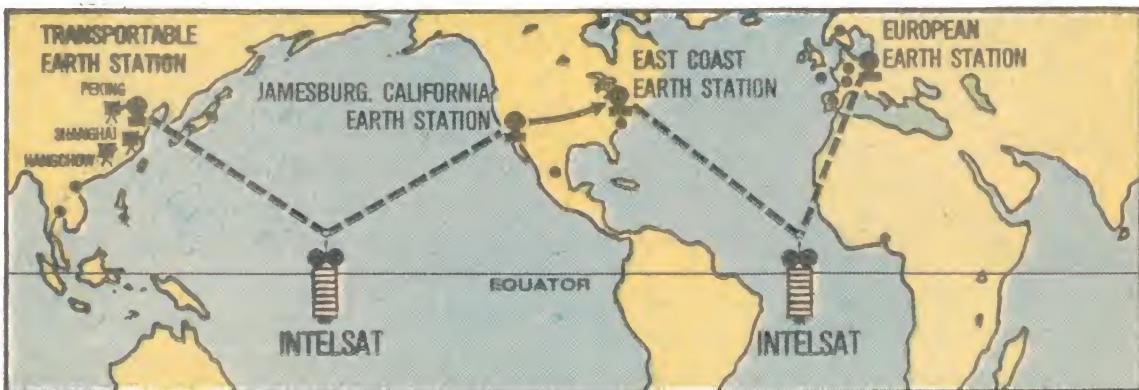
AND BY 1981, A SATELLITE BUSINESS SYSTEMS CRAFT WILL TRANSMIT DATA DIRECTLY TO ROOFTOP ANTENNAS OF U.S. BUSINESS AND GOVERNMENT AGENCIES FROM 22,300 MILES ABOVE EARTH.



COMPUTERS PLAYED A VITAL ROLE IN HELPING TO LAND THE U.S. LUNAR MODULE "CHALLENGER" AND ITS LUNAR ROVING VEHICLE TO EXPLORE A LARGER AREA OF THE MOON—  
... ANOTHER FIRST FOR THE UNITED STATES!



THE WORLD GREW EVEN SMALLER BY 1972, WHEN PEOPLE AROUND THE WORLD WERE ABLE TO VIEW LIVE TELECASTS OF THE U.S. PRESIDENT'S VISIT TO THE PEOPLE'S REPUBLIC OF CHINA VIA THE U.S.-BUILT INTELSAT III IN ORBIT ABOVE THE EARTH.



...SCIENCE OPENED A WHOLE NEW WORLD FOR MEDICAL SCIENCE WITH ZWORYKIN'S ELECTRON MICROSCOPE. IT VIEWS AN AREA AS MINUTE AS ONE-BILLIONTH OF AN INCH!

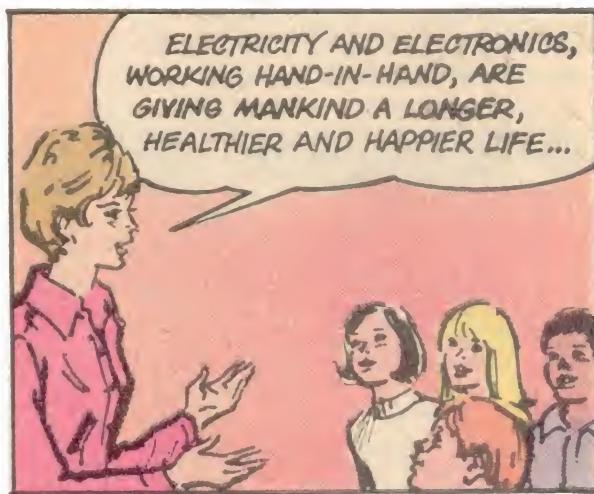
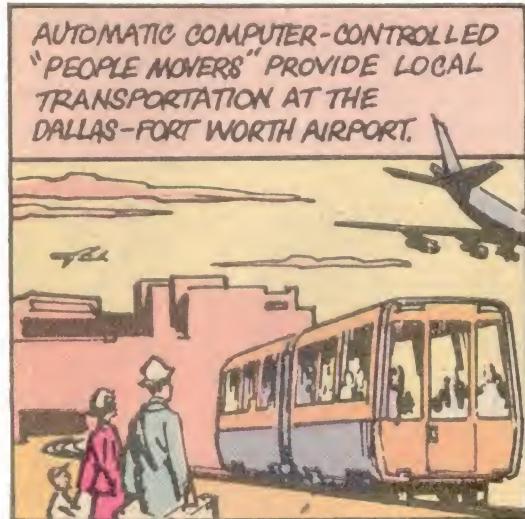


COOKING FOODS WITH MICROWAVE OVENS IS GAINING IN POPULARITY—SAVES TIME IN THE KITCHEN!

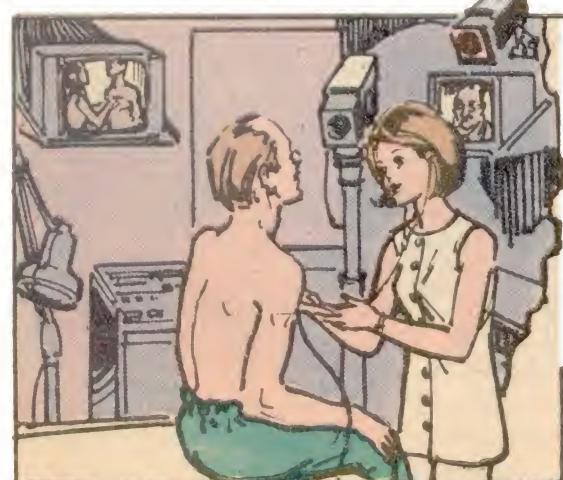
TELEVISION IMPROVEMENTS SINCE 1960 INCLUDE TELEVISION LENS ZOOMING, INSTANT VIDEO TAPE RECORDING, AND INSTANT "PLAYBACK" OF SPORTS PLAYS.



ELECTRONICS ALSO PLAYS AN IMPORTANT ROLE IN AIR SAFETY. A 747 JET CAN LAND OR TAKE OFF IN PITCH DARKNESS, RAIN, SNOW, SLEET OR FOG IN REASONABLE SAFETY.



TELEMEDICINE CLOSED-CIRCUIT TV LETS DOCTOR AND PATIENT SEE AND TALK TO EACH OTHER...

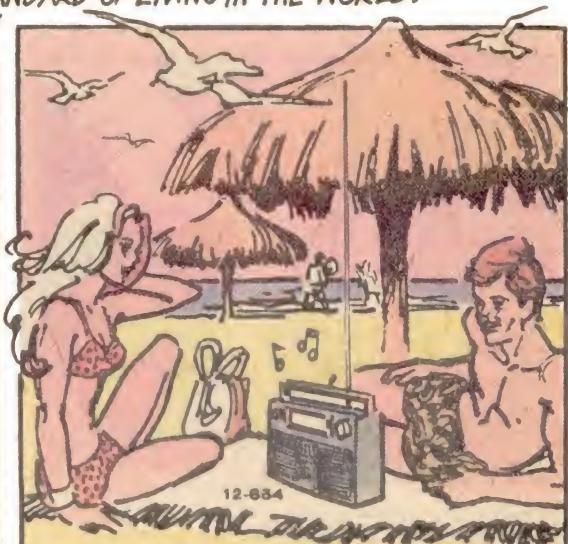


... BY LONG DISTANCE — MAKING A SPECIALIST'S SERVICES AVAILABLE OVER WIDER AREAS OF THE COUNTRY.

TODAY, MILLIONS OF PEOPLE IN OUR COUNTRY, THE UNITED STATES, GET TO ENJOY THE FABULOUS BENEFITS OF ELECTRICAL/ELECTRONIC APPLIANCES AND EQUIPMENT. IT HAS GIVEN OUR PEOPLE THE HIGHEST STANDARD OF LIVING IN THE WORLD. ELECTRONICS PROVIDES ENTERTAINMENT, TOO!



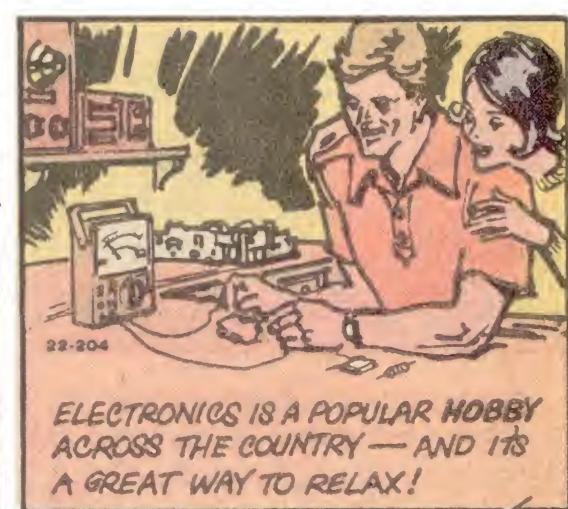
MOBILE CB-2-WAY RADIO HELPS TO MAKE TRAVEL HAPPIER AND SAFER...



12-634  
PORTABLE RADIOS FOR LOCAL AND SHORTWAVE LISTENING PROVIDE MUSIC AND NEWS OF THE DAY...



13-1106  
STEREO HI-FI COMPONENT SYSTEMS BRING US THE "LIFELIKE" SOUND OF MUSIC FOR HAPPY LISTENING!



22-204  
ELECTRONICS IS A POPULAR HOBBY ACROSS THE COUNTRY — AND IT'S A GREAT WAY TO RELAX!

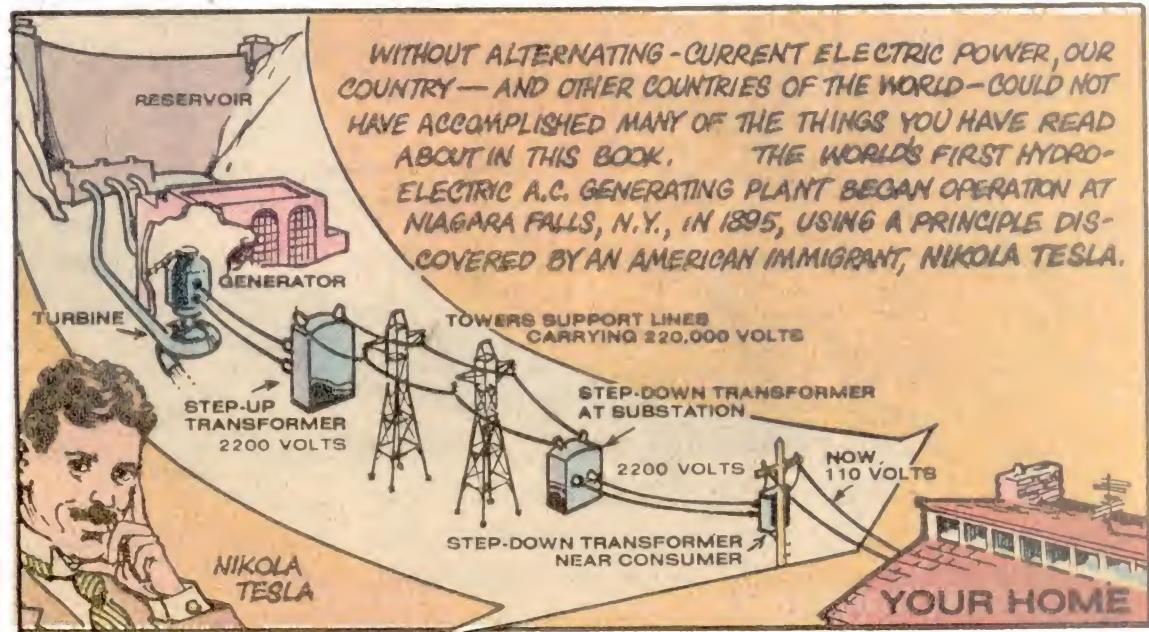
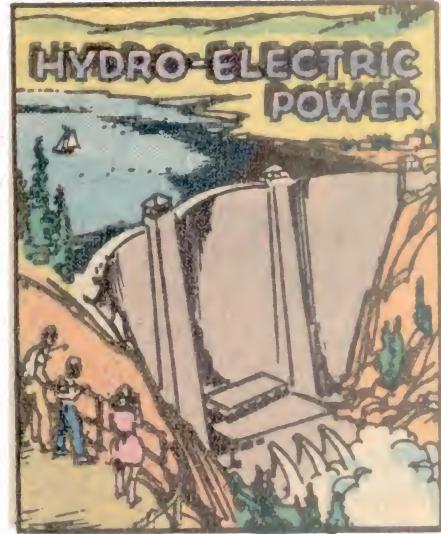


20-1  
PORTABLE TAPE RECORDERS MAKE POSSIBLE TAPING SPECIAL MUSICAL EVENTS AND FAMILY GET-TOGETHERS...

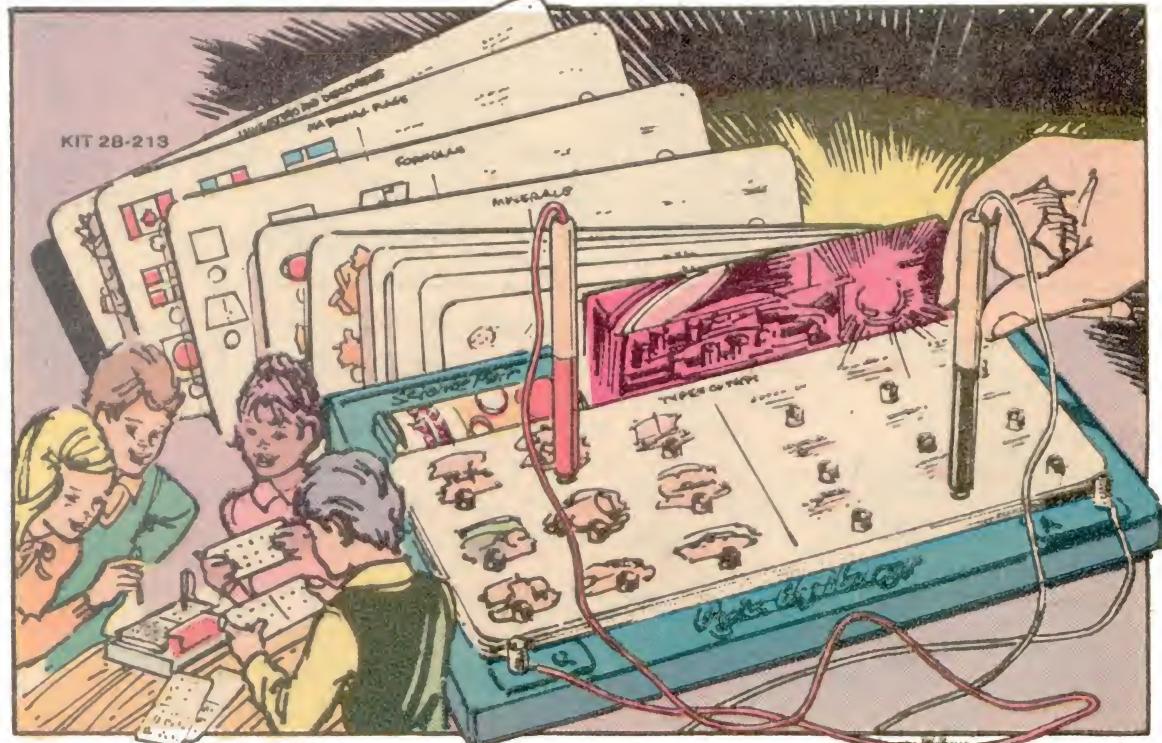
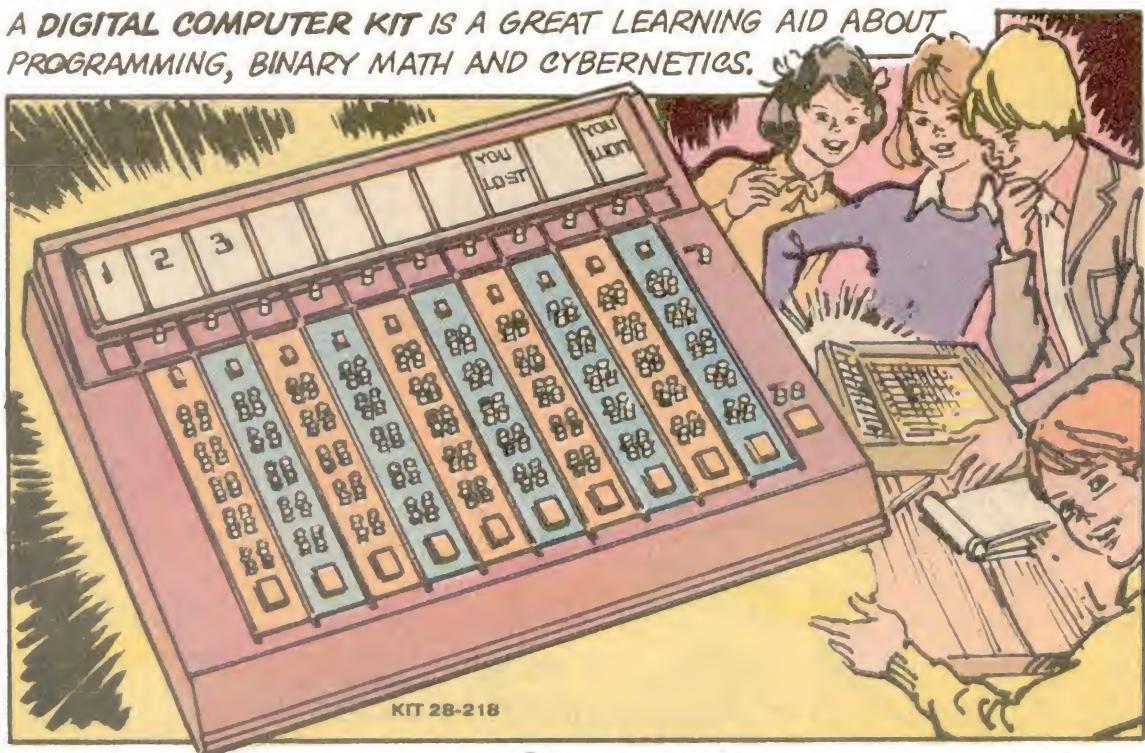


...AND NOW, THERE'S AN "OSCAR" IN ORBIT, THE SATELLITE USED BY HAM RADIO OPERATORS ... PIONEERS IN COMMUNICATIONS IN THE U.S.

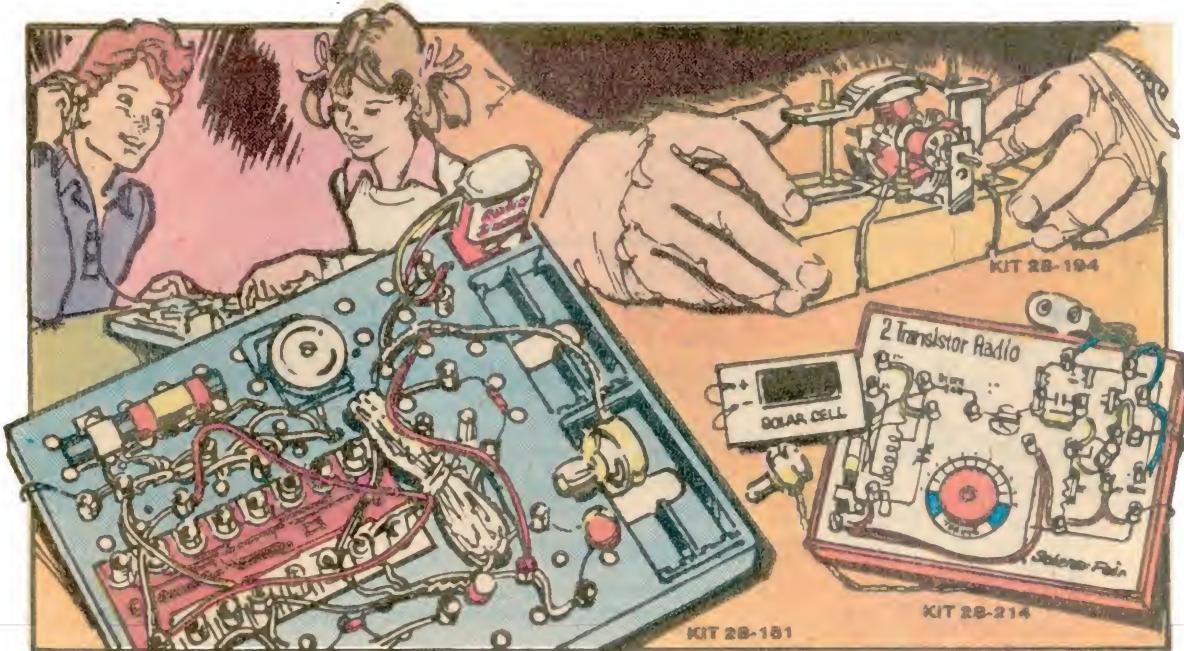
TODAY, THE UNITED STATES PRODUCES AND CONSUMES A THIRD OF THE WORLD'S ELECTRIC ENERGY TO GIVE ITS CITIZENS THE BEST STANDARD OF LIVING EVER ACHIEVED BY MANKIND, AND WE MUST CONTINUE TO EXPLORE THE FORCES OF NATURE FOR NEW SOURCES OF ENERGY... SOLAR POWER, COAL, GAS, STEAM FROM GEYSERS, WATER-POWER, NUCLEAR POWER... TO TURN THE TURBINES THAT PRODUCE OUR ELECTRICITY.



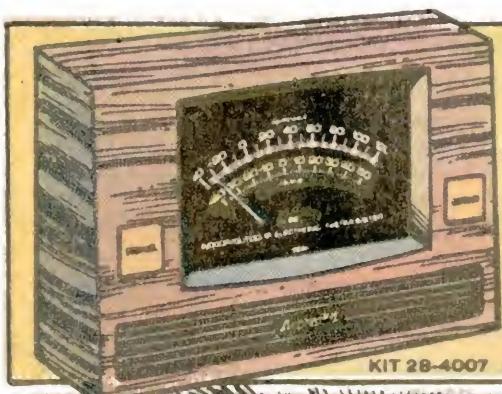
ELECTRONICS HAS ALSO BROUGHT NEW IDEAS AND EQUIPMENT TO AID IN TEACHING QUICKER AND BETTER WAYS TO LEARN ABOUT SCIENCE. A DIGITAL COMPUTER KIT IS A GREAT LEARNING AID ABOUT PROGRAMMING, BINARY MATH AND CYBERNETICS.



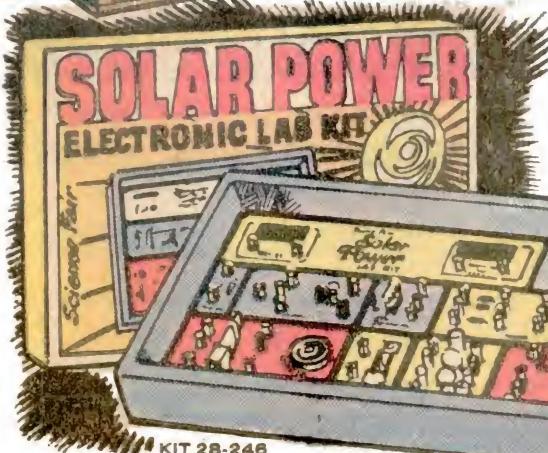
ELECTRONICS MAKES POSSIBLE A FUN WAY TO LEARN ABOUT SCIENCE, HISTORY, GEOGRAPHY AND OUR ENVIRONMENT WITH AN ELECTRONIC QUIZ-KIT. INSERT A QUIZ CARD... READ THE QUESTION... CHOOSE THE RIGHT ANSWER — AND THE PROGRAMMING PANEL LIGHTS UP!



JUST IMAGINE HOW HAPPY YOUNG SCIENCE EXPLORERS WOULD HAVE BEEN ABOUT 25 OR 30 YEARS AGO... TO BE ABLE TO PERFORM A HUNDRED OR MORE EXPERIMENTS WITH A SMALL TRANSISTORIZED LAB KIT—RADIOS, MOTORS, BURGLAR ALARMS, 40-CHANNEL CB RECEIVER, AND MORE. GREAT FOR GROUP PROJECTS!



MANY KITS CAN BE PUT TOGETHER BOTH FOR LEARNING AND AS A NICE ELECTRONIC DEVICE TO KEEP FOR EVERYDAY USE AT HOME—LIKE AN INDOOR-OUTDOOR ELECTRONIC THERMOMETER.



KITS ARE ALSO A FUN WAY TO LEARN ABOUT SOLAR POWER—ANOTHER GREAT PROJECT FOR SCHOOL OR HOME!



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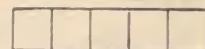
NAME \_\_\_\_\_

STUDENT  TEACHER  YOUTH CLUB MEMBER

STREET \_\_\_\_\_

CITY

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SCIENCE FAIR OR ARCHER KIT  
AT PARTICIPATING RADIO SHACK STORES

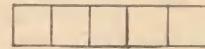
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Only one coupon for purchase of each kit

# SCIENCE FAIR® QUIZ

WHO ARE THESE FAMOUS INVENTORS FROM...  
HISTORY'S HALL OF HONOR®

(Answers at bottom of this page)



1. \_\_\_\_\_



2. \_\_\_\_\_



3. \_\_\_\_\_



4. \_\_\_\_\_



5. \_\_\_\_\_



6. \_\_\_\_\_



7. \_\_\_\_\_



8. \_\_\_\_\_



9. \_\_\_\_\_



10. \_\_\_\_\_



A. \_\_\_\_\_



B. \_\_\_\_\_



C. \_\_\_\_\_

11. \_\_\_\_\_

1. Joseph Henry (Dec. 17, 1797-May 13, 1878) Inventor of the Telegraph

2. Samuel F. B. Morse (April 27, 1791-April 2, 1872) Inventor of the Telephone

3. Alexander Graham Bell (March 3, 1847-Aug. 2, 1922) Inventor of the Telephone

4. Charles P. Steinmetz (April 9, 1865-Oct. 26, 1923) Electrical Engineer and Mathematical Wizard

5. Guglielmo Marconi (Apr. 25, 1874-July 20, 1937) Inventor of Wireless Telegraphy

6. Nikola Tesla (July 10, 1856-Jan. 7, 1943) Inventor of AC Motors and Discoverer of the AC Principle of

7. Vladimir Zworykin (July 30, 1889- ) Inventor of the Television

8. Thomas A. Edison (Feb. 11, 1847-Oct. 18, 1931) Inventor of the Incandescent Lamp (Electric Light Bulb)

9. Lee de Forest (Aug. 26, 1873-June 30, 1961) Inventor of the Audion

10. Karl Guthe Jansky (Oct. 22, 1905-Feb. 14, 1950) Inventor of the Radio Astronomer

11. Guglielmo Marconi (Apr. 25, 1874-July 20, 1937) Shared Nobel Prize for their invention of the Transistor

12. John Bardeen (May 23, 1908- ) Inventor of the Transistor

13. Walter H. Brattain (Feb. 10, 1902- ) Inventor of the Transistor

14. William Shockley (Feb. 13, 1910- ) Inventor of the Transistor

15. Guglielmo Marconi (Apr. 25, 1874-July 20, 1937) Inventor of the Transistor

16. Charles P. Steinmetz (April 9, 1865-Oct. 26, 1923) Inventor of the Transistor

17. Joseph Henry (Dec. 17, 1797-May 13, 1878) Inventor of the Transistor

18. Alexander Graham Bell (March 3, 1847-Aug. 2, 1922) Inventor of the Transistor

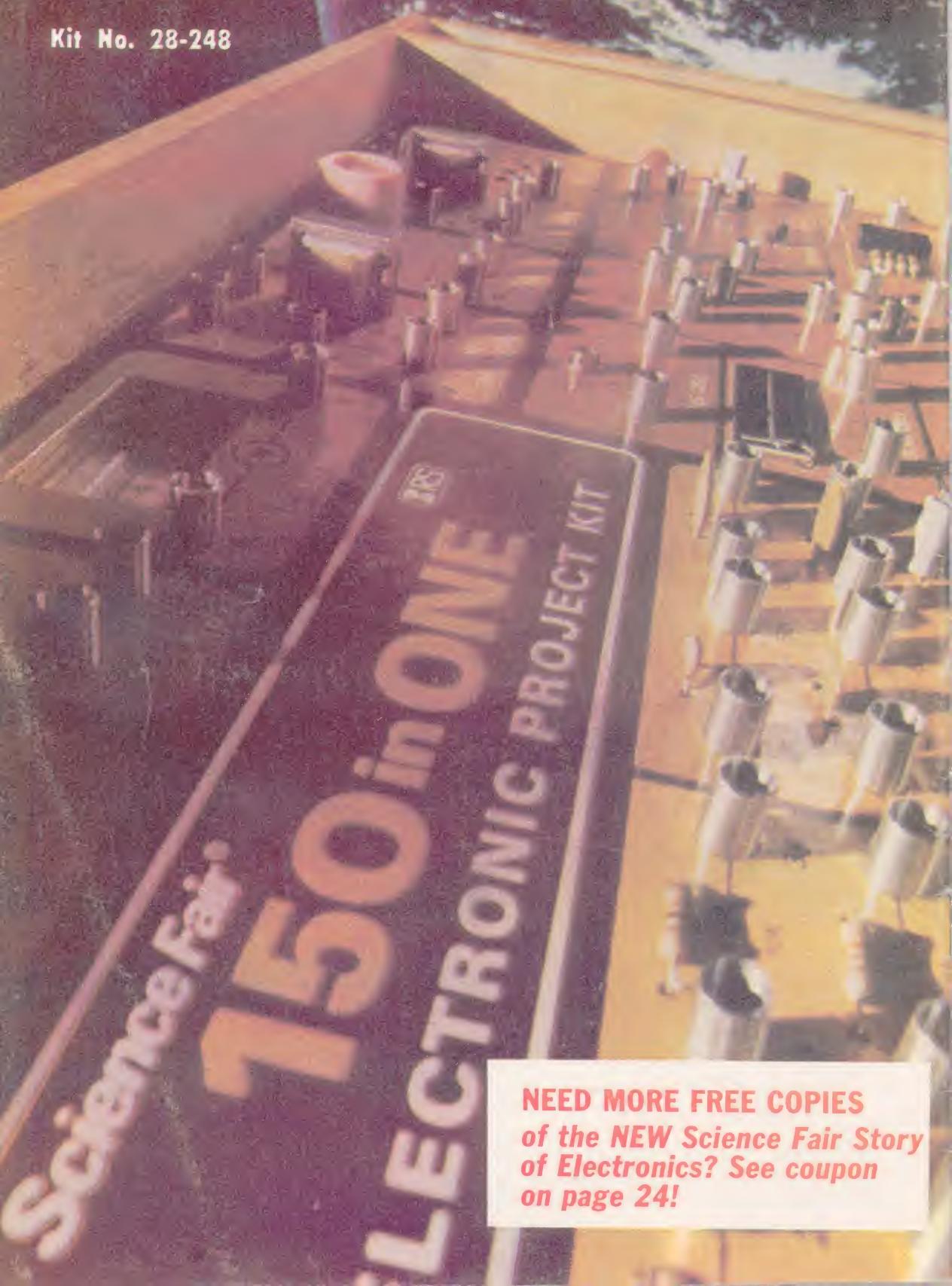
19. Guglielmo Marconi (Apr. 25, 1874-July 20, 1937) Inventor of the Transistor

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ANSWERS TO SCIENCE QUIZ

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